

Calculus

Name _____

An object moves along a line so that its position at time t is given by $s(t) = t^3 - 9t^2 + 24t + 3$ where $t \geq 0$.

a. What is the object's position at time $t = 3$?

$$21 \quad 3^3 - 9(3)^2 + 24(3) + 3$$

b. What is the object's velocity at time $t = 3$?

$$v(t) = 3t^2 - 18t + 24 \quad v(3) = (-3)$$

c. What is the object's acceleration at time $t = 3$?

$$a(t) = 6t - 18 \quad a(3) = 0$$

d. Is the object speeding up or slowing down at $t = 3$? Justify your response.

$$\text{Neither b/c } a(3) = 0$$

e. When is the object at rest?

$$0 = 3t^2 - 18t + 24 \quad 0 = \cancel{3}(t^2 - 6t + 8)$$

$$(t-4)(t-2)$$

$$t=4 \quad t=2$$

f. When is the object moving right?



g. How far does the object travel in the first 4 seconds?

$$|s(0) - s(2)| + |s(2) - s(4)|$$

$$|3 - 23| + |23 - 19|$$

$$20 + 4$$

$$24$$